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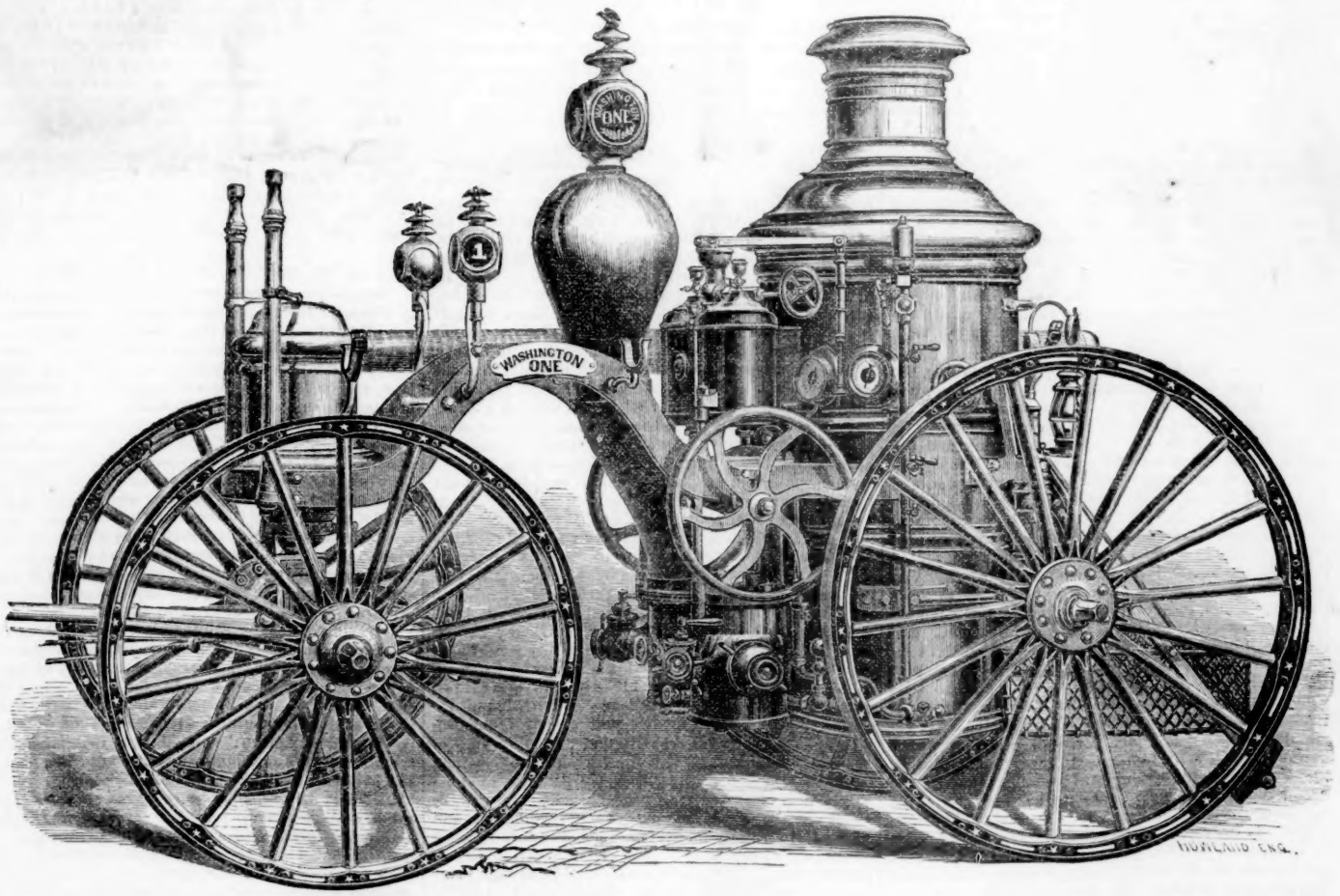
Double Steam Fire Engine.

A steam fire engine should possess, in the highest degree, the power of raising steam rapidly, and maintaining the working pressure steadily, simplicity of construction, durability, strength, lightness, and efficiency, so that it may be quickly at work, easily managed, reliable, and perform the greatest amount of work for its size and weight; and each quality should be attained without injuring or sacrificing another.

But these qualifications attained, the most important, and one not heretofore accomplished to any extent, is *manageability*, or the power of being readily regulated by one man, so as to throw a greater or less quantity of water, with a greater or less degree of force, through a long or short line of hose, and a large or small nozzle, or several at one time; for an engine will frequently be required, when working at a fire, to throw a small quantity of water one minute, and this amount to be largely increased the next minute, or *vice versa*; so that it is evident the power of varying the delivery, easily and surely, is most important, and an engine possessing it cannot fail to give better results, and be o more practical utility than one which cannot be varied; or, if the attempt be made to do so, only results in failure.



All steam fire engines as heretofore constructed have been obliged to work at very slow speed at times, and again run very fast, and in proportion to the speed at which they are worked a given proportionate amount of water was discharged. Sometimes it is necessary to throw a large stream, or a number of them, when it is found that the engine cannot run fast enough to supply the quantity of water needed. And again, the supply of water is at a distance from the fire, requiring a long line of hose, and consequently high pressure, when the engine will run slow, stick on the centres, and put an irregular pressure on the water, which bursts the hose; and when taking water from a hydrant, there is frequently a scarcity of supply; then, if the pump is too large or runs too fast, it will run away from the water, as it is called. All this forcing and irregularity strains the working parts more or less, and causes them to give out.

The manufacturer asserts that the steam fire engines made by their company possess all the advantages of others in design, materials and workmanship, and far exceed them in *manageability*; for, besides varying the quantity and pressure of the water discharged by the steam pressure, and the speed of the engine, it can be regulated by the pumps, independent of either, thereby remedying the difficulties arising from the impossibility of adjusting the speed of the engine, or always keeping the steam pressure, as required by circumstances.

After having their engines in service for the last two years, they have demonstrated the facts, that they excel all others of the same weight and capacity of steam cylinder, in forcing through a long line of hose, playing through several lines at a time, or large nozzles; for the small quantity of water delivered when desirable to reduce it; for the low pressure of steam at which they can run, in cases where high pressure is generally required, and maintaining an even pressure on the hose; and further, they will turn in their length, and special attention is given in their design to have them neat, light, and convenient to operate, in which respects they are not surpassed.

It is evident that the steam fire engine that will raise steam soonest, keep it best, work with the least liability to damage, weigh less in proportion to its power of throwing water, and be most readily adapted to all the circumstances under which fires occur, is the most desirable for the purposes for which these machines are used.

The illustration herewith given was taken from Engine No. 1 of Brooklyn. It is also similar to No. 33 of the Metropolitan Fire Department of this city, either of which can be seen at any time.

Further information can be had on application at the werehouse of the Gould Machine Company, 119 Liberty street, New York City.

A Singular Accident—Death of J. E. Van Steenburgh.

[*From the New York Times, Dec.* 4.]

J. E. VAN STEENBURGH, Cashier of the Bank of Fiahkill, died at Roe's Hotel in this village (Peekskill) this morning. He left New York for Fishkill at 5 o'clock yesterday afternoon, on the Poughkeepsie passenger train, intending to disembark at Fishkill Station. He secured a seat in the last passenger car, and before the train reached Peekskill fell asleep. After that place had been passed, and when the train was within two hundred feet of the draw-bridge above he suddenly awoke, and being confused, supposed the train had just stopped at Fishkill. Entertaining this idea he hurried to the front platform of the car and taking hold of the rail descended to the lower step and jumped off, still holding on to the rail, expecting to be compelled to run a little way before letting go. The train, however, was running faster than he supposed, and the moment he struck the ground, his legs were thrown under the forward wheels of the last car and both were crushed, the right one at the knee, and the left one just above the knee. Not a soul on the train knew of the accident.

As soon as the cars had passed the draw-bridge, the signal-man at that point heard groans, and started to go over his track southward. He soon arrived at the spot wherr Mr. Van Steenburgh was, and found him sitting upright with his legs on the trank and the ground about him covered with his blood. The signal-man endeavored to raise him up but could not, and then called two men, who were near by, to his assistance. It was found that it would not be advisable to move the unfortunate man by hand, and the two men remained with him while the signal-man proceeded to Peekskill station and procured a hand car. Mr. Van Steenburgh was placed upon this and taken to Roe's Exchange Hotel, near the track, where he was attended by the Peekskill physicians. Meanwhile word had been sent Superintendent Toucey, and that official telegraphed the conductor of the down express to stop at Cold Spring for Dr. Lent to whom he had also telegraphed. Dr. Lent and Mrs. Van Steenburgh reached Peekskill by the down express. The doctor, after examining the hurts informed Mr. Van Steenburgh that it was impostible for him long to survive his injuries. Mr. Van Steenburgh being still conscious, looked the docter in the face, saying he must be mistaken, as he felt well in body and heart. The doctor, however, urged him to settle his affairs of life as best and as soon as he could, which he did, making his will, etc. He did not appear to be much in agony through the night. His daughter reached here just before 8 o'clock this morning, going directly to the bedside of her father. At 9:30 A. M. he commenced to fail rapidly, and at 10 it was evident thet his death was at hand. At 10:08, having become unconscious, he died, surrounded by his family and numeroua friends.

Soon after Coroner McEntree held an inquest on the body, the jury returning a verdict in accordance with the facts herein stated. The remains were then convayed to Fishkill village. Mr. Van Steenburgh was 43 years of age, and had been connected with the Bank of Fishkill 18 years. He was very widely known and his loss and the sad circumstances of his death are deeply regretted.

Chemical Repertory.--No. 4.

DECEMBER 16, 1868.

Under this head it is my purpose to lay the foundation of what, I trust, may grow in time into a most important, if not the leading, department of this Journal.

Time will be a necessary element in the erection of this, as of any edifice intended to be substantial and enduring. I hope to enlist the assistance of American chemists. This may be an ambitious hope, but time will show.

I shall most cheerfully offer explanations and reply to questions on chemical points, addressed to me at this office; and I solicit all such.

HENRY WURTZ.

7. WOOD-TAR: A PRACTICAL SUBJECT FOR AMERICAN CHEMISTS.

The mere sight of our Sun, as morning after morning he soars majestically into the blue Empyrean, bathing the Earth with glory and with energy; might go far to excuse the superstition of Sun-worship in the heathen; but when we view him with the eyes of Science, it may well be held that it is only the conclusive evidence we have from the *same source*, that he is but a creature like ourselves, that could deter us from bowing the knee with the Parsees themselves. Astronomy and Geology tell us that he has shone upon our globe for time incalculable before our race began; but Chemistry, the youngest and most wondrous of the Sciences, tells us positively that all the energies we know on Earth are born of the Solar ray. Had the heathen mythologists possessed our lore, they would have made the car of Phœbus the prime motor of all Life, and of its wheels the fly-wheels of Existence.

Chemistry has told us further that during these incalculable ages that elapsed before the time of man, the Solar energies were occupied in his service, in collecting and storing up, in the the terrestrial viscera, exhaustless reservoirs of concentrated power, the real "fatness of the Earth," so purposely disposed of for his use and convenience, that none but fools can doubt. One of our latest achievements has been the distillation, from this solidified sunshine of the past, of its prismatic hues, in forms which may be bottled up and carried in our pockets. So justly do these brilliant compounds rival the finest tints of modern vegetable life, even the flowers of the field themselves, in beauty, while surpassing them so greatly in endurance and stability, that the imagination might well lead us to the fancy that these ancient sunbeams were of a different strain from ours, or possessed some pregnant energies of a kind now wholly lost and spent. This, however, cannot be so. The intermediate products, through metamorphoses of which these colors are produced, are by no means confined to fossil matters; and there is as yet no sound reason for supposing that the organisms of past geological Eons possessed any chemical constitution or texture now unknown to us.

These thoughts are suggested by the observation that some chemists are beginning to turn their attention to a still quite neglected waste product of certain large manufacturing operations, namely, *wood-tar*; and it would be well if numerous investigators would look into this anew, in the new lights afforded by the magnificent discoveries of the investigators of coal tar. Some observations of PETTENKOFER, in 1851, led his assistant, PAULI, to the discovery of *oxyphenic acid* in wood-vinegar. This is readily understood, in view of WAGNER'S observation that one of the two common forms of tannic acid gives by dry distillation oxyphenic, instead of its isomere, pyrogallic acid. LEFORT finds about one per cent. of oxyphenic acid in wood-tar, and proposes to utilize, in dyeing, certain colors which it strikes with ferric salts in presence of alkalies. Either animal or vegetable tissues are steeped for several hours in a solution of ferric chloride, drained, and then transferred to tar-water (one of tar to ten of water) at 60° or 80° C., for some hours. On washing with soap, a fine ash-gray (lavender ?) color, of great solidity, is the result. This result will serve, so far as it goes, as a commencement, and to remind chemists of a neglected field awaiting cultivation. The reader will remember that in a former issue, I took occasion to point out the fertile field American chemists have, in our great staple products (yet so little chemically known) of *turpentine* and *rosin*. Wood-tar of course includes not only pine-tar, but the products of the manufacture of pyroligneous acid, from other woods, which is now so extensive in this country.

H. W.

CHEMICAL *EXCERPTA*.

Under this head I purpose to gather in the most *condensed* form practicable, from such recent scientific journals, both at home and abroad, as come under my eyes; the substance of such articles as seem deserving thereof. In this work, I shall not, as might be thought, hold myself confined to novel facts alone; regarding new hypotheses, and even speculations, when involving labor and ingenuity in the *generalization* of facts, as even more valuable to Science. It is hardly necessary to add that in my own comments, to which a degree of personal responsibility attaches, a less condensed style than in the abstracts themselves will be inevitable.

HENRY WURTZ.

[*Phil. Magazine and Jour. of Science.*]

(August, 1868, page 141.) One of the most interesting conclusions of an important paper of G. J. STONEY, on the relations of Gases to Light-Undulations is: that in what we call a "vacuum" of the best air-pump, the gaseous molecules are still within a distance from each other of about 1-10^{8}th part of a metre, which is still but the *sixtieth part* of the wave-length of a ray of orange light. [In view of this, it may be suggested that there is nothing surprising in the familiar fact of the conducting power of such a miscalled vacuum for electricity of tension. Moreover, if it be regarded as now settled, that absolute aerial vacuity is impervious to electricity, it would appear as if we had now the crucial facts, determining positively that this imponderable is but an affection or motion of ordinary matter; and negatively against Dr. HARE'S theory, making it, like light and radiant heat, propagable through the Aether.—H. W.]

(Sept. 1868, p. 188.) "Mahomet's Coffin" Experiment. Raise the knob of a Leyden jar to a considerably greater height than is usual (12 to 16 in.) After charging, drop from a height of 8 inches towards the knob a little strip of gold leaf from 1¼ to 2 inches long, so cut that one end is sharper than the other, or in the shape of a quite acute isosceles triangle. If the broad end be directed downwards, the leaf will not touch the knob, but "take up a position in its vicinity without any support. There it will continue in mid air so long as the jar remains sufficiently charged."

This mode of realizing the well-known myth is stated by G. J. STONEY, F.R.S., who communicates it, to be ancient; and is is here exhumed by him from oblivion in in order to append its theoretical explanation, for which I must refer to the original. H. W.

[*Sept. and Oct.* 1868, *pp.* 222 *and* 241.]

The phenomena of supersaturated solutions strikingly illustrate the frequency of chemical *instability*, as a condition of matter, and the feebleness of the molecular influences and disturbances requisite in many cases to throw the internal molecules into profound commotion, and cause them to settle again into more stable crystallime or polarized solid forms. The same unstable conditions are extremely prevalent also even in solid bodies, particularly in those of the *colloid* and *viscous* classes, which seem to occupy the middle ground between absolutely mobile liquidity and absolutely rigid solidity. The phenomena are in some respects highly analogous to those which are classified as fermentations, but in other respects strictly opposite; inasmuch as the latter comprise usually changes from liquid forms, to gaseous or other liquid forms of higher stability, whilst the changes in supersaturated solutions are usually from liquid to solid forms.

Great light has been thrown lately upon these classes of phenomena by the industrious investigations of CHARLES TOMLINSON. He arranges the salts he has examined into five groups:

1. Salts whose supersaturated solutions remain liquid at low temperatures (unless touched by a body not "chemically clean:" sulphates of NaO, MgO, CuO; acetate, arsenate, succinate and borate of NaO; Rochelle salt and potash-alum; acetate of BaO; CaCl.

2. Salts whose supersaturated solutions suddenly solidify at low temperatures: carbonate, phosphate, and hyposulphite of NaO; sugar of lead; SrCl.

3. Salts whose supersaturated solutions deposit their excess of salt at low temperatures, or under the action of a nucleus, leaving the mother-liquor saturated: acetate of zinc; sulphate of CuO; BaCl; arsenate of KO; tartar emetic; citric acid.

4. Salts whose supersaturated solutions form modified salts of a lower degree of hydration: Sulphates of ZnO, NaO, and MgO; phosphate of ammonia.

5. *Anhydrous salts*, which do not form supersaturated solutions: nitrates of KO, NaO, BaO, PO, and NH^4O; KO, $2CrO^3$; NH^4Cl; ferrocyanide of potassium.

[With regard to the action of nuclei, or of the sides of the vessel, TOMLINSON'S view is that "when *chemically clean* the solution adheres to them as a whole, and there is no separation of the salt; when not chemically clean, there is a stronger adhesion between the salt and the

nucleus than between the salt and the solvent, and there is a separation of salt." He has previously applied similar ideas to the explanation of a class of phenomena which certainly seem strictly related to these, namely, the action of nuclei in exciting effervescence, or the evolution of gases, from solutions supersaturated therewith under normal atmospheric pressures. In his latest paper, TOMLINSON has tried to define what he means by "chemical cleanness," a point which had been considered obscure by some chemists.

The definition he gives seems to imply that a surface is chemically clean when free from all films or particles of *organic matter in decay*. It seems to be organic matter, in almost, if not quite, all the numerous extremely striking and interesting examples he cites to illustrate his views, that operates in exciting the changes; but he expressly states that it is probable "that all healthy animal and vegetable secretions are chemically clean, as well as the surfaces that secrete them" (he means in life, of course). Thus camphor spins on some such liquids when *perfectly* fresh, but they almost immediately change on exposure to the air, and then the camphor fragments become inactive. Chemically clean surfaces may be attained in chemical apparatus, by washing first with sulphuric acid, strong potash ley, or alcohol, then with water; also by ignition. Soda-water poured into a glass thus prepared will not part with a single bubble of gas to the sides. TOMLINSON'S papers are scarce second to the celebrated Memoirs of PASTEUR, on related subjects, in originality and suggestiveness.—H. W.]

[*Bulletin de la Société Chimique—August*, 1868]

At the session of the Société of June 5, 1868, JUNGFLEISCH made a communication on the reduction of nitric acid by tin and HCl. When the quantity of tin employed is insufficient to reduce the nitric acid directly, the reduction nevertheless continues and even becomes singularly active. It is then due to the presence of stannous chloride, which itself, in fact, is capable of effecting the reduction. At the Baltimore meeting of the American Association, in May, 1859, the writer read a paper in which Mr. JUNGFLEISCH'S observations were chiefly anticipated. This paper was partially published in the Proceedings of the Association for that year (Page 182). H. W.

(Page 317.) MILLON states that bisulphide of carbon may be completely deprived of all disagreeable odor by mixing with half its volume of milk of lime and distilling at a gentle heat. The vessels in which the condensed product is received should be absolutely clean, as the least trace of ordinary CS^2 communicates a bad odor to the whole. The purified CS^2 has an odor resembling chloroform. Instead of lime, litharge, Cu, Fe, or Zn may be used. Even agitation with one of these partially deodorizes it. In time, it becomes colored again, reassumes the odor, and leaves a residuum on evaporation; but to prevent this it is necessary only to leave in the bottles some shavings of copper, zinc, iron or litharge. Hydrated oxide of lead and powdered corrosive sublimate have been before used (the latter by CLOEZ) for this purpose. H. W.

(Page 320.) PUSCHER proposes to make what he calls an indelible (?) ink, by dissolving 4 grms. of *aniline black* in 15 grms. of alcohol with 60 drops of concentrated chlorohydric acid; the deep blue solution being then mixed with a warm mucilage of 60 grms. gum arabic in 90 grms. of water. He asserts (notwithstanding the free muriatic acid in it) that this ink does not attack steel pens (?), and is not altered either by acids or concentrated alkalies. He does not tell us, however, that alcohol will not wash it out! As PUSCHER does not tell how he prepares his aniline-black, it may be useful to recite here some of the formulæ that have been given for such product.

LIGHTFOOT'S.—Heat gently together 50 grms. aniline, 50 grms. HCl, 50 grms. Cu^2 Cl (dens. = 1.44), and 25 grms. KO, ClO^5.

KOECHLIN'S.—Mix, and after 3 days, boil together 50 grms. aniline, 50 grms. HCl, 25 grms. ferridcyanide of potassium, 25 grms. KO,ClO^5, and 2 litres of water.

DULLO'S.—Mix and allow to react in the cold 50 grms. aniline, 400 grms. HCl, 500 grms. pulverized peroxide of manganese and 5 litres of water. When the reaction is over, decant to remove from the excess of manganese, and wash.—H. W.

[*September and October* 1868.]

(Page 226.) M. FAUSTO SESTINI has examined the solvent and other actions of *liquid sulphurous acid* on various substances. It dissolves phosphorus slowly; iodine more rapidly with brown red color, this solution being unchanged in sunshine, and depositing crystalline iodine on cooling; bromine with great readiness, to an orange solution, unchanged by sunshine; crystallized sulphur in very small quantity; phosphoric and sulphuric acid in considerable quantities. With CS^2, it mixes when heated in a sealed tube with slowness, separating again on cooling; with benzole in the same way, with a yellow color, separating on cooling; with ether precisely as with benzole, a yellow color being engendered, such mixture losing in the air its CS^2, with restoration of the natural color and odor of the ether; with chloroform readily without change. SESTINI'S most noteworthy result, however, relates to its action upon *rosin* and other resinous matters, which it softens and dissolves readily, with a color at first reddish-yellow, becoming brown in time.—H. W.

(Page 320.) WINCKLER finds that a coat of *paraffine* protects wood, cork, etc., well from the action of chlorine; important in many chemical operations, as bleaching, chlorination of ores, etc.—H. W.

(Page 322).) Glycerine is liable to be adulterated with syrup of sugar and with dextrine. When diluted and boiled with *molybdate of ammonia* and some drops of nitric acid, no coloration is observed, if pure; but sugar or dextrine render the liquid blue. Too little water must not be used, as then the glycerine and nitric acid react, and spoil the result. To five drops of the suspected glycerine are added 100 to 120 drops distilled water, 3 to 4 centigrames of molybdate and one drop of pure nitric acid of 25 per cent. Boil for 1½ minutes. H. W.

(Page 332.) LEITENBERGER, acting upon the facts that *purpurine* is dissolved notably by water at from 25° to 55° C. (=77—130° Fah.); whilst at this temperature *alizarine* is almost insoluble, commencing to dissolve only at 75° C. (=167° Fah.); obtains these tinctorial products from madder by first treating it for some time with water and steam, at a temperature never above 130° F., and washing until the water runs completely colorless. From this solution the purpurine is precipitated by lime or baryta-water, and the lakes thus formed decomposed by chlorohydric acid. By solution afterwards in wood-spirit it may be obtained completely pure. The madder, after removal of the purpurine, is dried and then treated repeatedly with wood-spirit, with a steam heat, to extract the alizarine; the solutions of which, thus obtained, are poured slowly into water with constant agitation. A hydrate, less soluble than alizarine itself, is thus precipitated, which when dried is almost chemically pure. In this way are obtained, of purpurine 2 to 3 per cent., and of alizarine 4 to 4.5 per cent. of the madder.—H. W.

(Page 333.) WELBORN says that he preserves *ferrous sulphate* from oxidation, even in a bottle often opened, by placing in it a fragment of *camphor*, wrapped in paper.

(Page 333.) The lightest petroleum-naphtha, called in our American commerce "gasoline," has received in Germany the trivial name "petroleum-ether." A German Journal states that the very disagreeable odor of the crude gasoline may be removed, without distillation, by means of a simple treatment for a sufficiently long time with concentrated sulphuric acid, and washing repeatedly with water. It is then dried by chloride of calcium. If gasoline can really be completely deodorized, by this or by any other method, the uses of this very cheap and almost refuse product, might be greatly extended. It might even be used for extracting essential oils, the perfumes from flowers, etc. H. W.

(Page 335.) SWAGER makes NaO CO^2 by first acting upon the *double chloride of aluminum and sodium* heated to a high temperature in a retort, with superheated steam. HCl and *aluminate of soda* are formed, and the latter is then decomposed in solution, by CO^2. The HCl, with the alumina proceeding from the latter operation, are reconverted into the double chloride. This recalls at once the methods practised many years since by our countryman TILGHMAN of Philadelphia. One of these, identical in principle with, was apparently much simpler in practice than, the above. It consisted in conveying the vapors of common salt, by means of a rapid current of steam, through a mass of heated alumina, whereby the latter was likewise converted into aluminate of soda with disengagement of HCl. Practical difficulties, I believe, dependent on rapid destruction of apparatus, prevented the extension of TILGHMAN'S ingenious inventions. The wider experience of these days might probably overcome these difficulties. H. W.

(Page 336.) JEAN proposes to manufacture *borax* by the action of BO^3 on *sulphide of sodium*; the HS evolved being also utilized. He introduces NaO,SO^3 into the upper part of a vertical clay retort filled with red hot coke. The NaS collects at the bottom.—H. W.

(Page 336.) SCHINZ, in view of the great loss of heat-intensity in furnace operations by reason of the diluent effect of the nitrogen in the large excess of air ordinarily used, recommends the substitution of CO gas, thrown in together with air. He obtains the CO by calcining together combustibles with limestone, ensuring absence of CO^2 by subsequent passage over incandescent coke. In all this there is nothing especially new, which nevertheless detracts nothing from the importance of the subject. SCHINZ suggests that quicklime, thus made, would cover the whole additional expense of the CO, a suggestion whose validity, however, depends wholly upon *locality*.—H. W.

[*Chemical News—No.* 465, *Oct.* 30, 1868.]

(Page 204.) T. T. P. B. WARREN has found that by the action of ether on LIEBIG'S *Extractum carnis*, cerebric acid is separated, "derived probably from the nerves which ramify the parts from which the extract is made."

(Page 210.) A surprising statement is quoted from a Lyons newspaper, that a lady was killed by sleeping in a room with a large number of *quinces*; and that the air of the room was found to be suffocating in odor, with much CO and CO^2. Thus the exhalations from fruit appear to be as morbific as those from flowers and growing plants. H. W.

(Page 213.) Notes on bread-making, quoted from LIEBIG, contain nothing new worth condensing; except the surprising statement that the kind of bread we call "aerated," the use of which is now expanding in this country with such extraordinary rapidity, so much so that it is likely to be soon the chief kind of bread sold in our cities, has not taken at all well in Paris and other French cities, nor in Belgium and Holland. H. W.

[*November 13th*, 1868, *No.* 467.]

(Page 231.) With regard to the wonderful new discovery that the spectroscope will *at any time* distinguish and analyse the *red flames* proceeding from the edge of the sun's disc, which have hitherto only been seen during total eclipses, it is stated that Mr. LOCKYER, in 1866, suggested the possibility of such a discovery and made diligent attempts to realize it, in which he has only succeeded early in November, in time to make the announcement of the actual observation simultaneously with that of the independent discovery of the French astronomer JANSSEN, made in India, immediately after the great eclipse of August 18th last. Of the three spectroscopic lines so far distinguished, from the red flames; two belong to hydrogen, but the third has not been identified, and has not yet been observed even in the ordinary solar spectrum! [It thus appears that there are stupendous eruptions of intensely heated or burning hydrogen gas, conveying with it some substance as yet unknown, and thousands of miles in height, continually proceeding from various points of the surface of our great central luminary! Father SECCHI writes from Rome to the Abbe MOIGNO that he has confirmed these extraordinary discoveries. He saw a protuberance *entirely detached* from the sun's border, in which the hydrogen line C was unmistakeable; also a *twinkling flame*, visible and disappearing alternately! Have we here the true explanation of the twinkling of the stars? LOCKYER also announces further that he finds the whole sun enveloped by an atmosphere of hydrogen nearly 5000 miles thick, of which the flames or eruptions are but local accumulations, or *ebullitions*, so to speak. This newly discovered photosphere is "marvellously regular in its contour" otherwise, being equally thick at the poles and equator of the sun.—H. W.]

[*November 20th*, 1868, *No.* 468.]

(Page 247.) SCHIENDEL describes the preparation of a new color from *naphthaline*, "naphthaline scarlet." Naphthaline is acted on by nitric acid not stronger than 45°, in the cold, to form nitronaphthaline, and the latter reduced to naphthylamine, by zinc in powder, with an alkali. Other naphthylamines do not give the color. Fractional distillation isolated a new alkaloid, which is liquid, crystallizes about zero C., and distils at a higher point than ordinary naphthylamine. It is oxygenated and forms salts. To obtain the color from it, it is heated with mercurous nitrate, and the brown matter thus formed heated with more of it. The crude red thus produced, when purified, is solid, brilliant, soluble in alcohol, and dyes all fibres. Its production, however, is stated to be uncertain.

[The curious coincidence (if such it be) must be pointed out that a French patent (*Brevet*, No. 79,738) was recently issued to M. CLAVEL, for a red color from naphthaline prepared by a mode precisely similar in all its details, to that claimed by SCHIENDEL. The supposed new alkaloid appears to be the *phthalamine* of SCHUTZENBERGER and WILLM (*Comptes Rendus*, 47, 82, 1858; also *Jour für pr. Chemie*, 74, 75). $C^{16}H^9NO^4$, which they obtained ten years ago by treating a crude naphthylamine (obtained by reduction of nitronaphthaline with ferrous acetate) with sulphuric acid; two sulphates of differing solubility being thus formed, the less soluble of which is the sulphate of naphthylamine $C^{20}H^9N,SO^3+3HO$, and the more soluble the sulphate of phthalamine $O^{16}H^9NO^4,SO^3+3HO$. Phthalamine, precipitated by ammonia from this latter salt, is in the form of oily drops, heavier than water, tastes like naphthylamine; salts do not redden in the air. CLAVEL'S mode of operation is much more practical and precise

than that of SCHIENDEL, as above. Naphthaline is converted into nitronaphthaline by nitric acid of 1.33, this then reduced by iron and nitric, or zinc and muriatic acid; and on distillation of the crude product, naphthylamine passes over first; then another alkaloid, boiling about 300° C. (phthalamine), liquid at 15° C., but below this butyraceous. This new (?) alkaloid it is that generates the color. It is mixed with half its weight of dry nitrate of mercury and heated to 120° C. (Whether mercuric or mercurous nitrate not stated, but probably the latter.) Naphthylamine is then added in quantity equal to that of the other base employed, and the heat continued for 15 minutes. The color is extracted by acidulated water, and precipitated by common salt. It is, according to CLAVEL, more solid than fuchsine, which it approaches in tint, though possessing "superior freshness and purity." CLAVEL has covered with his patent not only this red color, but all other colors, whether *blue, violet*, or otherwise, which may possibly be *hereafter* obtained! It is to be hoped, and indeed expected, now that we have at last something apparently of value producible from this hitherto useless, though beautiful, product of the Gas Works, that something will be made of the *cartloads* of naphthaline, which the Rev. Mr. BOWDITCH says are obtainable from the British Gas Companies.—H. W.]

(Page 247.) HIORTDAHL reports new analyses of the native alloys of Au and Ag of Kongsberg in Norway. The veinstone of the veins which carry native Ag with but 0.002 to 3 per cent. of Au, is principally calcite, but alloys much richer in Au occur in *quartz* veins. In samples from three localities were found 45, 50 and 53 per cent. of Au, and from two others 26.9 and 27 per cent. With the latter may be classed a previous analysis of FORDYCE, giving 28 per cent. Au. SAMUELSEN found also 5.5 per cent. of Pt and a trace of Pd. In the mattes of the Kongsberg Smelting Works, Se and Te are readily recognizable, derived doubtless from an auriferous pyrites with which the ores are smelted. Native alloys of this class almost always contain more Au and less Ag than the above. I may call to mind in this connection that DAVID FORBES found in the finely crystallized native silver of Kongsberg 0.4 per cent of Hg.—H. W.

[*Journal of the Chemical Society, April*, 1868.]

(Page 128,) W. J. RUSSELL has sought to devise practical plans for the complete analysis of gaseous mixtures in a single tube, without transfer, and by means of liquid reagents. The two essential points in his modifications are as follows: The reagents are introduced into the eudiometer tube by means of small glass syringes with recurved ends like those of the pipettes usually employed, the liquid being ejected from them by means of a small piston composed of cotton; this syringe being roughly graduated, to show the volume of the reagent introduced. To remove one reagent, so that another may be introduced, he introduces a small steel wire, with a wad of cotton previously well moistened and squeezed out afterwards in the hand, which at once absorbs the liquid and leaves the mercurial meniscus bright and dry. I have myself tried these devices, and found them admirable.—H. W.

[*Annales de Chimie et de Physique.*]

(March, 1868, page 257.) J. L. SORET states, as his conclusion from an extensive research upon the question of the density of ozone, in continuation of one previously published (same Journal, Jan'y 1866), that ozone is denser than oxygen. When oils of turpentine and cinnamon are treated with ozonized oxygen, the diminution of volume is sensibly double the increase of volume obtained by heating so as to destroy the ozone. The rapidity of diffusion of ozone is greater to a marked degree than that of chlorine, and very near to, but somewhat less than that of carbonic acid; from which facts it follows that its density is much less than that of chlorine, and a little greater than that of carbonic acid. The number 1.658 which he adopts for the density of ozone, agrees with all the facts. H. W.

[*Comptes Rendus—June* 29, 1868.]

MAGNUS writes to REGNAULT that he finds the mineral *sylvine* (sylvite, DANA); which occurs in large transparent crystals in the *carnallite* of Stassfurth, and whose composition is K Cl; is as diathermanous as many rock salts, allowing 76 per cent. of incident heat to traverse 26 millimetres of its thickness. He found a Wurtemberg rock salt, which allowed 92.6 per cent. to pass. As with rock salt, the diathermancy of sylvite does not vary with the temperature of the source, a property heretofore known only in the case of rock salt, among all transcalescent bodies. H. W.

[*Journal für praktische Chemie—Vol.* 103, *p.* 121.]

HAUSHOFER has examined the action of water upon granites. Some of his conclusions are that gypsum promotes the decomposition of these rocks by water, and that herein is found the explanations of the use of plaster in agriculture. Carbonic acid also exalts the action of water (as long since determined by our own Prof's ROGERS) and prolonged contact does not seem to sensibly influence the action. H. W.

ERRATA.

By reason of absence when the last issue of the REPERTORY went to press, two or three errors crept in:—At the end of the first item of the *Excerpta*, in the equation; for $C^{12}A^5$, KO. read $C^{12}H^5$ O, KO. Through a transposition of the fifth and sixth Excerpts, the observations on AgO^2 are apparently attributed to SALET, instead of WOEHLER, as they should be. For "*Le Chemiste*," read *Le Chimiste*. H. W.

Gold Genesis.

[The subject of the following, written to, and recently published by, Mr. HEATHERINGTON, of the Nova Scotia *Mining Gazette*, has already been adverted to in these columns (issue of Nov. 16th, under the motto of "*Stat pro ratione voluntas.*") This much fuller exposition of my views is therefore reproduced from the *Gazette*; the more especially as some slight lapses both of pen and types, occur in it as there printed. I would add that having read Siluria since writing the article, I but find the stronger confirmation of the views conveyed therein, in every tittle. I shall soon return to this topic, either in our own or in othe columns, or in both.—H. W.]

Your allusion, in your last issue (of Oct. 23, 1868, just received) to my "Gold-Genesis," and the honor you there do me, in coupling my name, though merely in a controversial connection, with that of the illustrious Sir RODERICK MURCHISON, renders it compulsory on me to break my silence. Though far from desirous of emulating the frog of fabled fame, in his bovine ambition, and not presuming to suppose that this note will command the attention of so great an authority, or even, it may be, ever reach his eye; yet, on the other hand, I must not, through diffidence, withhold my hand in the contest which is now beginning to agitate the geological world (at least that portion of it who look with chemical eyes), nor incur the imputation of—

> "The Devil's darling sin,
> The pride that apes humility."

I therefore hasten to say that I cannot accept but with many grains of salt these most recent views of the great geologist, so far as I am yet acquainted with them. Unluckily I do not own MURCHISON's new edition, nor have I as yet even had an opportunity to peruse it; and for the present I have at command only the brief digest of conclusions that you have quoted in your columns. Let me point out that in this I have at least the advantage that I start with such impressions of Sir RODERICK's meaning as have been conveyed by him *to the scientific world*, unwarped or unobscured by any light (or darkness) that might have emanated from my own prejudices or hypotheses. The conclusions quoted by you, therefore, as those of the eminent author of Siluria, are:

"1. That, looking to the world at large, the auriferous vein-stones in the Lower Silurian rocks contain the greatest quantity of gold."

It happens to be my good fortune that your readers have had placed before them the more important results of my own studies of this grand subject, namely those submitted in my American Association Memoir of 1866 on *Gold Genesis*. This Memoir has been far from receiving from the scientific public the general attention that; apart from any claim I might set up to novelty of discovery and induction, and zealous labor in deduction; would seem due to the deep interest of the subject itself. I wish it, however, to be looked upon merely as the preliminary notice or announcement of my engagement in this path of research, in which I shall continue to press on, so long as the appropriate energy is granted me.

It will be remembered that the *fundamental fact*, upon which my theoretical scheme of Gold-Genesis is based, is a new and remarkable observation made by me, and published more than ten years since; to the effect that solutions of sulphate of sesquioxide of iron are capable, to a small but perfectly appreciable degree, of taking up metallic gold into solution. Coupling this fact with the belief, now of universal acceptation among chemical geologists, that gold and gold-bearing sulphurets have been of aqueous deposition; I have proposed a theory carrying back the history of gold to a time when it was all held in solution, in the waters of the Primeval, or, as I prefer to call it, the "Prozoic Ocean;" before the FIAT LUX went forth, when neither Life, nor its precursor, Light, as yet were born. This Prozoic Ocean was, as I have shown, a thoroughly *Oxidated Ocean*, and the sulphurets of iron, now so abounding in the older crystalline rocks, granites, and schists, *must have been* dissolved in this ocean as persulphate. From the neglect with which these elaborate papers of mine have been treated, having obtained no notice from journals ostensibly devoted to recording the progress of these subjects, I fear they have been mistaken for crude and premature speculations, and generally thrown aside without due examination. I claim, on the contrary, that the time is not far distant when they will be recognized as conveying a comprehensive and consistent inductive theory, fully capable of explaining nearly, if not quite, all facts and generalizations hitherto made regarding the metallic sulphurets, at least those of sedimentary and metamorphic rocks. The persulphate of iron of the original ocean, whence have been derived, through deoxidating zoic agencies, the sulphurets of iron of these rocks, was far more than ample to hold in solution all the gold of the earth's crust.

It follows from these views that whenever and wherever, in the bosom of this lifeless ocean, *organic existence* began, with its concomitant and resultant processes of *deoxidation*, then and there Gold Genesis also began. The ferric condition must there and then, and thenceforth until now, have vanished; and even *before* complete reduction of the sulphates into sulphurets (which reduction is a function only of *dead* organisms, or of their educts), the solvent power over gold must have been destroyed. Any tyro in laboratory lore will sustain the impossibility of retention of gold in a *ferrous* solution. It may therefore with reason be asserted that the ultimate verdict of human observation will connect the birth of metallic gold with that of Life; an induction which seems not among the least remarkable of the conclusions of science available to the poet. The dullest imagination should kindle at such a theme.

As in these studies, however, we must not allow our imaginations to kindle; let us cooly apply the test of *facts* to the hypothesis involved in the first position of MURCHISON, as above. We shall find that it does not "hold water." In fact, one of the two most extensive and productive gold fields as yet known has been proved to be of an age far later than the Lower Silurian, being by some brought down, on *fossil* evidence, even as late as the Jurassic. I refer, of course, to the California rocks.

To this example I shall now add only one more; a case in which a gold field, of much extent and established richness, is now being developed in rocks deemed, also on evidence of fossils, to be of much earlier age than the Lower Silurian. This is the new Madoc and Marmora region, north of Lake Ontario. Even as I am writing, a journal is laid before me (*American Journal of Mining*, of Oct. 31, 1868, p. 277) giving new testimony from two independent geological observers, of the truly auriferous and highly promising character of this Lower Laurentian, or Eozoic, gold field. The idea is in fact becoming so prevalent and familiar among geological writers that auriferous sulphurets and quartz are not necessarily of any special age, that citation of authorities would be unnecessary waste of space. It follows of necessity from the postulates of my theory; for when the earlier sediments of the ocean were broken up, and new deposits formed from their ruins, the eroding and destructive agencies having always been partially, if not wholly, *subaerial*, would be accompanied by a reaction and reabsorption of some of the oxygen which had previously been liberated through vital action. Hence, by a reconversion of the iron sulphurets into ferric sulphate, there would be a renewed solution of the gold therein, in places where the oxygen was in excess; to be reduced again and redeposited in other places where the sulphurets themselves or the organic matters may have been in excess. My explanation of the mode of *concentration* of gold of all ages into auriferous beds, pockets, veins, etc., is founded upon this repeated alternation of oxidating and reducing operations; for a fuller understanding of which, however, I must refer to the original memoir.

The remaining three of MURCHISON's *dicta* I shall be obliged, on this occasion, to consider collectively. They are:

"2. That where certain igneous eruptions penetrated the secondary deposits, the latter have been rendered auriferous for a limited distance only beyond the junction of the two rocks.

"3. That the general axiom before insisted on remains, that all secondary and tertiary deposits (except the auriferous detritus in the latter) not so specially affected, never contain gold.

"4. That as no unaltered purely aqueous sediment ever contains gold, the argument in favor of the igneous origin of that metal is prodigiously strengthened; or, in other words, that the granites and diorites have been the chief gold-producers, and that the auriferous quartz bands in the Palasozoic rocks are also the results of heat and chemical agency."

From these it can only be inferred that MURCHISON adheres with pertinacity to the view that gold is always of eruptive origin and exotic derivation. In this I think he will find few *chemical* geologists to agree with him. The only view approximating to that of Sir RODERICK, which seems to receive much acceptation at present, is that of STERRY HUNT; which, while maintaining the exotic derivation, rejects explicitly the igneous agency; and claims, as he has expressed it in his recent Report on the Nova Scotia Gold (page 11), that "the gold of the ancient strata was brought to the surface in a state of solution, and that the watery sol-

vent held also alike the elements of the accompanying metallic sulphurets, and the silica which now forms the quartz layers." Elsewhere he assigns to these watery solvents a strongly *alkaline* condition. These views, which would make of each quartz vein a sort of deposit from an alkaline *mineral spring*, seem to have been received with remarkable favor by the geologists and chemists participating in the discussion of the subject, that took place at the late Chicago meeting of the American Association. I allude to this in support of my assertion that the tendency of chemical investigation is towards a belief in the introduction of gold into the veins in some form of aqueous solution, and not in fusion, or by sublimation, or other (properly termed) *igneous* agency.

My own views differ from those of both these gentlemen, as I claim, in pointing out an original matrice for the gold, in the oceanic waters; and in attributing its introduction into the veins, pockets, etc., to a clearly explained process of segregation or concentration from the enclosing rocks, instead of an exudation from some unknown (and unimaginable) source in the terrestrial *viscera*.

As to the asserted *invariable* connection of an auriferous condition of rocks with the neighborhood of igneous eruptions, I must say that neither my observation nor my reading have had any tendency to confirm it; that I do not doubt the exceptional, will prove as numerous as the concurrent cases, and that I deem it altogether a *non sequitur*. It is true that cases do frequently occur of igneous dikes in rocks bearing gold veins; but is it not as reasonable and probable a hypothesis that, instead of the latter being derived from the former, they are *both* parallel effects of the same "chemical agency," pervading the masses necessarily in highly varying degrees in different parts? By the way, what significance here has the introduction of the term "chemical agency," which is so used as almost to convey the sense that there might be igneous agency without chemical agency.

As to the assertion that "no unaltered purely aqueous sediment ever contains gold," I claim that this is yet to be *proved*, and that no adequate chemical examination of the point has ever been made.* Such sediment might contain a proportion of gold scarce perceptible to an assay, and yet if the gold in some hundreds of feet of its thickness were concentrated in a fissure two or three feet wide, a rich gold-vein would result. Moreover, I am obliged in conclusion to suggest the question: What is *meant* by the phrase an "*unaltered* purely aqueous sediment?" Is any such thing known to exist? If a *solid rock* at all, was not the very solidification into rock a chemical alteration? And apart from this, do not geologists concede the uncertainty and even the improbability of the existence of any rock, even uncrystalline, which has not been made up of the detritus from previously crystalline rocks?

I remain, sir,
Very respectfully yours,
HENRY WURTZ.

* This statement must be modified, since the great chemist, GAHN, as I have pointed out in Gold-Genesis, explicitly asserts, as the result of a lifetime of analytical labor, that there is *no pyrites in existence destitute of gold*, in traces at least.

The Atmosphere.—The French Academy of Sciences recently published the results of the observations on the atmosphere made by Camille Flammarion in an extended series of balloon ascensions. The first chapter of the report establishes a law of variation of the watery vapor in the air, and asserts that the invisible moisture accumulates to the maximum zone of humidity, and then decreases until it finally disappears. The second chapter shows that the solar radiation increases in the upper regions in proportion to the diminution of the moisture and of the temperature of the air. The third chapter treats of the circulation of the atmospherical currents. The fourth establishes the diminution of the temperature according to the altitude. The fifth gives very curious observations on the altitude of clouds of different forms, their variations and physical construction. The sixth gives several problems on optics, acoustics, and general physics, of which the definite solution is not yet completed.—*Phila. Ledger.*

Fire-Damp.—A new invention, by M. Delaunier, of Paris, for destroying fire-damp in mines, has been laid before the French Academy of Sciences. It consists of a copper conductor, broken at intervals, but joined by very fine gold wire soldered to the copper; the gold wire being surrounded by flowers of sulphur, which ignite easily. By passing strong currents of electricity through the copper wire, the gold wire becomes red-hot, and thus ignites the sulphur, which burns any noxious gases which may be present. It will, of course, be understood that the electric current is made to pass through the apparatus before the descent of the miners into the mine. The Academy of Sciences have reported favorably on M. Delaunier's invention.

Correspondence.

[Correspondents in all cases should sign their communications with their names and address in full, not necessarily for publication, but as a guarantee of good faith —EDS.]

A Query to be Answered.

MISS., November 23, 1868.

MESSRS. EDITORS: I wish to know if I can fill a gasholder, situated two miles and a half from the gas works. The first mile and a quarter of main is already laid, the dimensions of said main being six inches, starting at the gas works six hundred yards and then reducing to four inch running 1000 yards, and then reducing to three inch running 1000 yards; at the end of my three-inch main I am twenty feet higher than where I started at the gas works.

I wish to know if I attach a two-inch main and run it the remainder of the distance, if I can fill a gasholder of 2000 cubic feet capacity in nine hours, under the same pressure I am now working under—one and a half inch pressure. The distance that I run the two inch main being very hilly, but on a descent all the way; so that at the end of the two inch main I am at the same level as where I started at the gas works.

By answering the above either by letter or through your valuable Journal you will oblige,

Respectfully yours,
ENQUIRER.

[We insert this as a sample of some of the queries we are receiving continually from our numerous correspondents. We have also decided to wait and ask some of our able correspondents among the Gas Fraternity, to send in an answer. Now, gentlemen, is your time. Promptly is the word!—ED.]

Complimentary.

ASHLAND, O., Dec. 6, 1868.

MESSRS. EDITORS: Enclosed find three dollars, being for one year's subscription to the Journal, which please send by mail as heretofore.

We cannot think of running gas works (even small) without the *light* of the Journal. Many thanks for the many valuable and interesting articles you furnish, and hoping you will do all in your power to induce Congress to lighten the burden of taxation on "small gas works," and in urging the holding of the proposed Convention of Gas Engineers, etc.. I am,

Most truly yours,
W. H. H. POTTER,
Sup't Gas Works, Ashland, O.

The Imperial Gas Co., of London.

THE COMPANY'S WORKS AT ST. PANCRAS AND SHOREDITCH.

The following article, which appeared recently in an English journal, is highly interesting, as giving readers on this side the Atlantic an idea of the magnitude and capacity of the Imperial Company's works at St. Pancras and Shoreditch. The writer, previous to giving a detailed description of the works, which is given below, says that,

"In fixing a site for gasworks, it is desirable to have them below the mean level of the streets, and to have facility of access for the delivery of coal, and facilities for the removal of residual products, coke, tar, ammonia, lime, etc. The gasworks in London are usually limited in space; this causes the retort-beds to be built to a greater height than is desirable, frequently in five tiers, or 10 retorts to each furnace, which are inconvenient to charge, and when one is out of repair the other nine are stopped from working. Coke is now generally used to heat the retorts, which is economical, and greatly in favor of not polluting the atmosphere in the locality. The illuminating power of gas depends greatly on the degree of heat imparted to coal in the process of its decomposition in the retorts; too much heat, or of too long continuance, give a large production, but deficient in illuminating power. By a careful management of the process the illuminating power of the best coal may be made equal to that of Cannel The condensable matters—tar, ammonia, and aqueous vapor—should be separated perfectly from the gas in passing through the scrubbers, in order to give the absorbing materials their full effect in the subsequent purification; that is, alkalies or lime for the absorption of carbonic acid and sulphur, oxide of iron for sulphur, and water for ammonia, and it would, no doubt, have a beneficial effect to extend the purifying appliances, so as to eliminate completely the deleterious substances in mixture with the gas. The sizes of the mains are determined by the amount of lights to be supplied to a given district; more properly speaking, they should depend on the probable requirements of a district. Consequent on a rapid increase of most of those in London, the mains first laid down have been found insufficient, and have frequently been replaced by larger ones.

"ST. PANCRAS.—The Imperial Gas Company's works at St. Pancras stand on about 8 acres of ground. There are 662 fire-clay retorts, from 17 to 20 feet long, exclusive of the cast-iron mouth-pieces, arranged in five different houses, some in three tiers and some in five tiers. The coal used is Usworth, and is brought by rail direct to the company's siding at King's Cross. The wagons, specially constructed for this purpose, carry 10 tons of coal. They are made with hinged doors at the bottom, whereby the coal is discharged at once into a large hopper; at the bottom of the hopper there are eight openings to load the hopper trains, each of which carries 2 tons of coal; the coal is conveyed in these to each side of the different retort-houses, and discharged into the coal stores; 3 per cent. of Cannel is mixed with this coal. The Cannel is brought by the Regent's Canal into the company's dock, and raised to the higher level by a steam engine. 180 tons of coal are used per day at present, and about 520 tons during the winter season.

"The cooling of the gas issuing from the retorts and condensation is effected by 10 double annular pipes; the gas passes through the annular space; both the pipes are thus made to act on the condensable products. The condensation is previously greatly assisted by the mains between the retorts and the condensers. Four exhausters draw the gas from the condensers, and force it through two scrubbers, two wet lime purifiers, two sulphuric acid and sawdust purifiers, and, lastly, six oxide of iron purifiers. There are two sets of these scrubbers and purifiers, only one at present used. The exhausters are 4 ft. in diameter, 3 ft. 8 in. wide (Beale's patent), each driven by a 20 horse power trunk-engine. Each exhauster will pass 140,000 cubic feet of gas per hour, going 60 revolutions. The exhaust is 1¼ in. of water, and the pressure to force gas through scrubbers and purifiers into gasholders varies from 17 in. to 24 in. of water column.

"A well is sunk 80 ft., and a boring made at the bottom of it 340 ft. = 420 ft. The water overflows into the well from the chalk. There are two table-engines near the top of this well, one of which works 6 pumps in the well, the water being forced up in one main. The other engine works six pumps for pumping tar and ammoniacal liquor from tanks into barges. Another small engine pumps these liquids into the tanks.

"There are 10 gasholders which will store 4,360,000 cubic feet of gas.

Size and Capacity of St. Pancras Gasholders.

No.	Ft. in diam.	Ft. deep.	Contains per foot.	Total cub. feet.	
1	85	34	5,674	192,917	
2	63	24	3,118	74,832	
Top lift	3....146 6	25	10,276.	256,840	518,863
Bottom ditto.	3....115 6	25	10,381	202,025	
4	50	17	1,962	33,405	
5	100	38	7,850	298,300	
Top lift	8....134 6	25	14.198	353,725	715,075
Bottom ditto.	8....135 3	25	14,414	360,350	
9	120	45	11,310	497,640	
10	142	54	15,833	854,982	
11	131	54	13,476	727,703	
12	103	54	8,330	449,820	
Total				4,363,539 feet.	

"The largest consumption of gas in one day last year was 4,769,000 cubic feet. The quality of gas is tried by a photometer. Not more than 20 grains of sulphur are allowed in 100 cubic feet of gas, and the test for sulphur (acetate of lead) is frequently tried at each purifier. The best test for carbonic acid is lime water, and this, the most deleterious of all impurities, in impairing illuminating power, should be effectually removed. The pressure of gas at the valve-house varies from 8-10ths of an inch in the day to 3 inches at nights in the several mains for distribution.

"SHOREDITCH.—The Imperial Gas Company's works at Shoreditch stand on 7 acres of ground. There are five retort-houses, containing 646 retorts; 216 of these are at present in operation. They are arranged in 3 tiers and 5 tiers. Some of the former are now being taken out and replaced by others built in five tiers, as the works cannot be extended in a lateral direction; this plan is resorted to to increase the make of gas. The retorts are all fire-clay, D shaped. Each retort is composed of three 7-ft. lengths, 3½ inches thick, luted together, and fitted with cast-iron mouth pieces; they thus form a working length of 20 ft., and charged each with 5 cwts. of coal. The coal used is Dean's Primrose, Pelaw Main, Usworth, and Monkwearmouth, mixed with 3 per cent. of Cannel. The coal is hoisted from the Regent's Canal to the high level (25 feet) by a steam engine, whence it is conveyed and discharged into the various coal stores by hopper trains. A well is sunk

through chalk to the depth of 350 ft.; three pumps in the well force the water up in one main. There are three pumps for the tar, and three for ammoniacal liquor, and two for the drainage of the yard; these are all driven by two table-engines of 10-horse power each. There are three exhausters, 4 ft. in diameter, 3 ft. 8 in. wide, to pass 140,000 cubic feet per hour, at 60 revolutions, each driven by a 20 horse power trunk-engine; one exhauster to pass 100,000 cubic feet per hour, driven by a 15-horse power trunk-engine. The exhaust pressure from the retorts is 1 in. of water and the pressure required to force gas through the condensers, scrubbers, and purifiers into gasholders is 21 in. average. The condenser consists of 20 single pipes, about 24 inches in diameter; from thence the gas is forced through two scrubbers about 22 ft. in diameter, having five tiers of sieves, on which small coke is laid, to intercept any tar with which the gas may be impregnated, and which would retard its subsequent purification. Water is supplied at the top, which absorbs any ammonia that may still be unseparated. From the scrubbers the gas is passed into two wet lime purifiers about 22 ft. in diameter. Fresh portions of the mixture are constantly exposed to the gas by mechanical means, and the carbonic acid is thus separated. From these the gas is forced through oxide of iron purifiers; there are nine of these, oblong in shape, each 25 ft. by 18 ft., has five tiers of sieves on which the oxide of iron is laid, and the gas is passed through a certain number of these, so that the sulphur in the gas should be separated most completely. There is, lastly, the dry lime purifier, of the same dimensions as the others, with 3 tiers of sieves, whereby the remainder of carbonic acid and sulphur should be removed. It has been observed that dry lime is to be preferred to wet lime on account of the water in wet-lime having an affinity for olefiant gas, which would weaken its illuminating power. The gas now passes into gasholders, of which there are 8—

	Diam., ft.	Height, ft.	Work'g capacity.	
At Bethnal-green.	...1....199½	 80	2,500,000	telescopic.
"	.....2....128	 68	 939,000	"
"	.....3....124	 50	 630,000	"
At Shoreditch	.....4....105	 34	 360,000	single.
"	....5 ... 85	 27	 150,000	"
"	....6.... 50	 18	 32,000	"
"	.....7.... 50	 18	 32,000	"
"	.....8.... 50	 18	.... 32'000	"
Total			4,606,000	

"These gasholders have no counter balance, acting with their weight on the gas forced through the mains, and to a certain extent regulate the pressure. The gas from the holders is brought to one point at the valve house, and distributed from thence through different mains as follows:—

	Inches in diam.	Day pressure.
1. Dog-row main	12	1 inch of water.
2. Bethnal-green main	12	1 "
3. Old Islington main	12	1 "
4. Old Hackney main	12	1 "
5. New Islington main	12	1 "
6. Holloway main	24	½ "

"The night pressure varies at every hour, and ranges from 8-10ths of an inch to 4 inches of water column. The pressure of five of the mains is regulated by valves. There is another 24-inch main for the Holloway district, not passing through the valve-house. The pressure on each of the Holloway mains is regulated by a governor, by which the pressure is made uniform. The supply is regulated to the demand. If an increase in the influx of gas from the holders takes place beyond what is required in the mains, the opening for the outlet of gas is reduced, the pressure being always maintained above that at the governor, and that required in the mains.

"The illuminating power of the gas is tested by Sugg's photometer; 5 cubic feet of gas per hour should be equal to the power of 12 sperm candles of 120 grains each.

"The coke made at Shoreditch is sold at 8s. ($2) per ton, the breeze 1s. (22 cents), affording a cheap and clean fuel for the district. It is used by founders for smelting, and for various purposes. These works are remarkable for the order and cleanliness everywhere apparent in the arrangements, and for the absence of anything that can be obnoxious to the neighborhood."

Gold in Dutchess County.—We learn from authority that cannot be disputed, that gold has been found in paying quantity in Dutchess County of this State. There is nothing theoretically absurd in this statement. The mere occurrence of gold need surprise nobody. It is one of the most widely-diffused metals of the earth; and the whole Appalachian range, in particular, is known to contain it. Whether it will be as profitable to mine for gold as to make butter and cheese in Dutchess County, remains to be seen. The assays of Drs. Torry and Pohle are above suspicion, as far as those gentlemen are concerned, and the former pronounces the average value of the specimens he selected to be $118 49 per ton. Prof. Pohle's report we have not yet seen. The particular locality is the March Farm, six miles east of Rhinebeck station.—*Am. Journal of Mining.*

Miscellanea.

ALVAN CLARK AND HIS TELESCOPES.—The following communication, recently sent to the Editors of the New-York *Evening Post*, will interest our readers:

"In a remote part of the city of Cambridge, Mass., some two hundred rods south of the thoroughfare from Boston to Harvard College, lives Alvan Clark, the astronomical optician, and one of the most notable men of the country.

"While scientific Europe confers her highest honors on her Frauenhoffers and her Dollands, the *savans* of England have awarded to this recluse the palm of unrivalled skill in the preparation of object glasses for the largest refracting telescopes. Born in the early part of the present century, and educated only in a common district school of an obscure village in Massachusetts, Mr. Clark has successively followed the employments of farmer's boy, engraver, miniature and portrait painter, and optician. With a strong taste for art, he spent the evenings of his farming period in the study of mechanics.

"As a portrait painter his success was proverbial, and his picture of the late Dr. Hare, of Philadelphia, and that of Dr. Hill, of Cambridge, are specimens of great skill. Not content, however, with this employment, which he seemed to have mastered, he betook himself to his present calling. Allured by the difficulties, which in a wonderful manner he has overcome, the fame of his success reached Europe, and he has prepared numerous object-glasses for the most renowned amateur observers of England. Stimulated by this success, he undertook the preparation of a glass 18 in. in diameter—larger than any that had been successfully used in the world. Destined for a Southern university, the war gave it another direction, and whatever may have been its success at Chicago, Professor Bond, of the Observatory of Harvard College, who at the time was using the largest and best refracting telescope of European manufacture in the world, not excepting the renowned instrument of Pulkova, declared to his committee of superintendence that the 18-inch telescope of Mr. Clark had revealed to him twenty stars in the nebula of Orion, which had never before, to his knowledge, reached telescopic vision.

"Testing his object-glasses by the remotest telescopic stars, and at all seasons of the year, Mr. Clark's firmament is not that which we ordinarily behold, nor that even which is revealed by ordinary telescopes, but a region the glories of which few beside himself can at present witness.

"The two sons of Mr. Clark, excellent mechanics, are opportunely furnishing the mounting apparatus, and orders from individual astronomers in every part of the country, as well as from institutions, are continually pouring in upon them.

"Mr. Clark is by no means unconscious of his superior and almost exclusive skill, but this is not manifested in vanity so much as in a happy enthusiasm which it is pleasant to witness. His extraordinary power seems to be acuteness—acuteness of the eye, acuteness of the touch, and finally, acuteness of the understanding, combined with unlimited patience. Three universities of our country have conferred their honors upon him, and he has received from the American Academy of Arts and Sciences its gold medal as a token of its appreciation of his eminent services in the advancement of optical science."

ORIGINAL LETTER FROM ROBERT FULTON.—The letter which we print below was addressed by Robt. Fulton to Andrew Brink the captain of the *Clermont*, the first steamboat of the Hudson river. The original letter is in the possession of Persen Brink, of Saugerties, N. Y., and a copy of it was sent to the Kingston *Argus* for publication:

"NEW-YORK, October 9, 1807.

"Captain Brink—Sir: Inclosed is the number of voyages which it is intended the boat should run this season. You may have them published in the Albany papers. As she is strongly made, and every one, except Jackson, under your command, you must insist on each one doing his duty, or turn him on shore and put another in his place. Everything must be kept in order—everything in its place, and all parts of the boat scoured and clean. It is not sufficient to tell men to do a thing, but stand over them and make them do it. One pair of good and quick eyes is worth six pairs of hands in a commander. If the boat is dirty or out of order, the fault should be yours. Let no man be idle when there is the least thing to do, and make them move quickly.

"Run no risque of any kind, when you meet or overtake vessels beating or crossing your way, always run under their stern, if there be the least doubt that you cannot clear their head by 60 yards, or more.

"Give the amount of receipts and expenses every week to the Chancellor. Your most obedient,

"ROBERT FULTON."

REMARKABLE CAVE IN CONNECTICUT.—A remarkable cave has recently been discovered on the farm of Mr. Frederick Miles, Salisbury. The entrance consists of a narrow winding passage about three feet wide, two feet high and fifteen feet in length, descending into a chamber fifteen feet high, hung with beautiful stalactites. Passing through this chamber there is a wide but low apartment about twenty feet in length, terminating in a large room where large stalagmites warn one to tread carefully, while above the stalactites sparkle and reflect the light from the candles. Passing through another gallery is a room where a large stalactite reaches from the roof to the floor and forms one vast pillar, resembling a sheet of water frozen. About four feet from the floor this pillar spreads out in all directions, like an inverted tunnel or a cone, and as one continues looking at it, it appears to be flowing like water. Passing along through a number of galleries and large rooms too many and varied to particularize, the visitor comes to a room which baffles description. The roof of this room is shaped like a dome, but in the centre of the dome a large circular opening extends to a room above, while the sides of this opening are literally covered with stalactites which descend several feet below the aperture and assume an endless variety of shapes—some tapering to a point like icicles, while others are shaped like leaves and others are carved in the most exquisite manner possible.

Effect of Lightning on Metals.—The following curious communication has just been made to the Paris Academy of Sciences. A woman was crossing a canal bridge, near Nantes, when a powerful flash of lightning seemed, according to her own expression, to envelop her; she was not in any way injured, but the contents of her purse underwent an extraordinary change. A ten-franc gold piece was in the small minor pocket of the *portemonnaie*, and two silver coins in the larger division of the same. A certain quantity of the silver was vaporized by the action of the lightning passed through the leather lining of the purse, and was deposited with great uniformity on the gold coin, which had all the appearance of silver, while the surface of the silver coins had assumed the appearance of having been matted or frosted. M. Bobierre, who made the communication, said that he had examined the gold coin with a microscope, and found that the silver was uniformly deposited, apparently in the form of globules, without any intervals between them. Having removed a small portion of the silver by means of a weak acid, M. Robierre found that the surface of the gold coin had been affected, and presented a very different appearance to that produced by the coining press, and was in fact, nearly in the same condition as the deposited silver; fusion had in fact commenced, but the effect had been instantaneous, and purely superficial.—*Am. Journal of Mining.*

Prices of Gas Coals—Dec. 15.

PROVINCIAL.

Duty, $1 25	Coarse. Gold.	Slack. Gold.
Block House	$1 75	$0 75
Gowrie	1 75	0 75
Lingan	1 75	0 75
Sydney	2 13¾	0 71¼
Pictou	2 13¾	1 18¾
Little Glace Bay	1 75	1 00
Caledonia	1 60	0 75

AMERICAN.

	Coarse. Currency.	Slack. Currency.
Westmoreland Co.	$8 50	$8 00
Despard Coal Co.	8 25	8 00
Penn	8 50	8 00
Newburgh Orrel Gas.	8 50	8 00

Delivered in New York.

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" " Cannel	14 00
" House Cannel	18 00@19 00
" " Orrel	16 00@18 00

Per ton 2240 lbs., Ex. ship.

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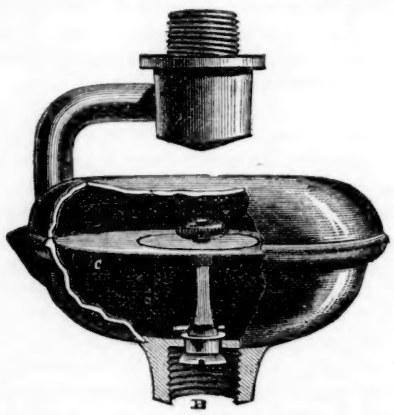

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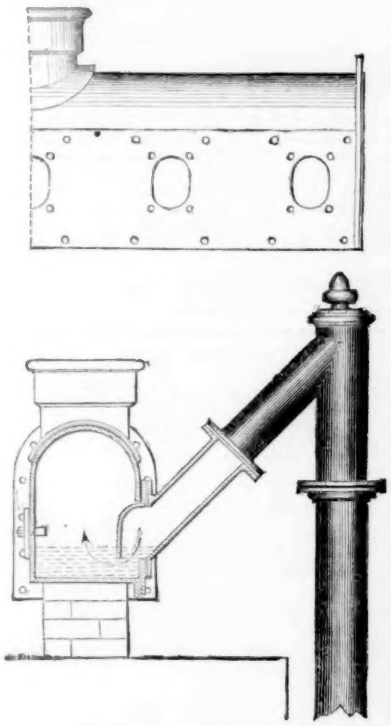

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[NOTE BY PROFESSOR WURTZ.—Contributions and items for which I am, as a Scientist, individually responsible, will have attached my full name or initials.—H. W.]

WEDNESDAY, DECEMBER 16, 1868.

WISHING TO MAKE this Journal an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of those subjects a pleasure, or a profession.

Subscribers would confer a favor upon us by remitting *CHECKS* or *POST OFFICE MONEY ORDERS*, as we are frequent losers where money is enclosed in letters.

☞ NEWS AGENCY.—The American News Company, 119 and 121 Nassau street, New York, are agents for this Journal. Newsdealers will please send orders to them.

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NOTICE.

☞ *All Collections for Advertisements, Subscriptions, etc., are made directly from this Office. We have Agents to solicit the same, but they are not authorized to Receipt for Money.*

Answers to Correspondents.

T. D., of Ontario.—The American Meter Company, of this city, can supply now a set of Photometric Apparatus. The apparatus complete will cost about $250. We do not think you can find any of English manufacture here.

O. M. D., of Ind.—Do not give heed to those senseless agitators who are constantly decrying the gas meter, and alleging it to be always wrong—of course some meters may be unreliable, and register against the consumer; but the error is just as likely to be against the company. The charge that companies intentionally overfill meters is simply absurd, and about as credible as that your grocer intentionally makes indentations in his measures to reduce their size, or employs light weights.

B. S. W., of N. O.—According to the experiments of Dr. Henry, olefiant gas and carbonic oxide are of the same specific gravity. One cubic foot of these gases weighs 250 grains.

S. P., of Md.—Benzole and benzine are identical. The former designation is generally adopted by scientific writers. Nitro benzole is sold by the apothecaries under the name of oil of myhrbane. It resembles the oil of bitter almonds in odor and taste very closely, and indeed is often substituted for it in perfumery and confectionery.

—The new stone dam across the Farmington river, at Collinsville, Conn., built by the Collins Company, is built of granite blocks cemented, with the top course dove-tailed together.

TIT FOR TAT.

It is time for us to call the attention of our readers to the success of our efforts to elevate the scientific position and tone of this Journal. We point especially to this number, with reasonable and justifiable pride, and trust that the important assistance we are receiving from our new coadjutor Professor Wurtz, will receive the appreciation that it merits. It is due to Professor Wurtz that we should state that his work is as yet done *con amore* that he has no pecuniary interest in the Journal, and no suitable remuneration. His present purpose will be served if he succeeds in interesting our readers in the scientific aspects of the subjects within our scope, and in attracting the attention of the men of science of America to our Journal. His claim to the latter must be clear to the meanest capacity, far more to the intelligent class of men among whom our columns circulate. His articles are very far from being mere selections, or even mere translations and abstracts. They are mostly condensed original *Essays* on the topics treated of, full of new ideas and suggestions. This is as it should be, in any journal claiming to be Scientific, and we have no hesitation in claiming that our own *strictly scientific* calibre must now be conceded to be fully equal to that of any journal in America. More than this, it is the purpose and expectation of Prof. Wurtz to make our columns the vehicle of conveyance to the world of original scientific *discovery;* and he already has promises from some of the most eminent of American scientists of contributions belonging to this highest order of all.

We call on our readers to remember that the establishment and elevation of a Journal devoted to their special pursuits cannot but react upon and elevate in the most rapid and effectual way their own positions and status in the community, and that therefore their professional pride, their *esprit du corps*, and their own interest generally, should prompt them to second in every way the efforts we now are making on their behalf. We ask in return active efforts from them. We want increased circulation and advertising patronage, original contributions and correspondence, and everything else that any journal wants. In return we promise to "push things," and not merely to *cultivate* the paths and fields of industry that they and we have chosen in this vale of Life, but to make them to fructify and yield their increase, and to "blossom as the rose."

THE ERA OF GAS-LIGHTING.

Poets sang and artists painted the glories of the Golden Age, when the Earth brought forth spontaneously all the comforts of man—such as they were—fitted perhaps to the times when mankind was content with eating and drinking. The Silver Age, more sonorous than its predecessor, looked a little beyond the admonitions of the stomach—the ears and eyes came next to demand the rights of the body politic, and mankind was thereby initiated into the tastes of progress. The Brazen Age, however, usurped its place, and soon ran its predecessor's laudable ambition into the Era of Iron. The ferruginous tyrant rusted civilization down into a barbarous sesqui-oxide, but the water of Christian civilization restored it to its pristine beauty, and prepared it for the age of Spirituality, of Life and Light. It developed the age of Gas—of Gas-Light.

How beautifully the physical, the moral and the mental world travel side by side. While steam rushes us through the world with hurricane speed, the hydrocarbons light the way, and the press symbolizes the thoughts of the speaking magnet. THE GAS-LIGHT JOURNAL carries light to mens' understanding, and the understanding of men—of aggregated men, prompt them to erect Fountains of Light to illuminate the homes and firesides of whole communities. Like the immortal Goethe, the cry of light! more light!! more light still!!! becomes the theme of forward marching mankind.

We have fairly entered the Era of Light—the age of ethereal progress—the age of spiritual vitality. While steam has taken upon itself the labor of the hands, and Gas has turned the dreary night into radiant light, mankind as assumed the perogative of thought. THE GAS-LIGHT JOURNAL, that carries this upon its face to all quarters of the globe, is the offspring of a thought—a brilliant thought—a thought that dispenses light and life into all the dark recesses of our great empire. What is the motive-power of this all but spiritual light? We have fairly entered the age of Gas, ponderous matter has become subordinate to the manipulatory wonders of caloric, working through the sinews of water and sinews of atmosphere, while gases furnish the intellectual man with vitality and light—the oxygen with mental vigor, the hydrogen with light and buoyancy, reversing, as it were, the ponderous for the imponderous, and giving him *levitation* enough to equiliorate the downward tendency of the universal law of gravitation.

We have Gas-Light, Electric Light, and Calcium Light, and finally we are to be blessed with Magnesium Light; not only by the cubic foot, but literally by string-measure, at so much per yard, all wound round a bobbin, like Clarke's patent thread. Who can gainsay that this is the age of Light and Knowledge, when a man may take from his pocket a bobbin of a thousand yards of illumination as brilliant as the light of Arctums? We have also the climax of cheap light, heat and motion in the famous Gwynne-Harris or "Hydrogen Process," which produces illuminating gas at less than one-half the usual cost, and gas for heating and for a motor at one-fourth the cost of ordinary gas. We may therefore concede that Light mental and Light physical are destined to raise mankind a grade higher, and make this Earth a heaven. Selah!

THE LEOW BRIDGE.

Every one who has visited New York city have, of course, observed the pedestrian bridge which spans Broadway at the corner of Fulton street. This bridge (a very shaky one), was erected about two years since, under the enterprising auspices of Alderman Leow, for the convenience and safety of people who are constantly pouring from the Fulton Ferry and adjacent points, and whose lives were endangered by the great number of vehicles that at all times are passing to and fro at this place.

For a time people without number passed over the bridge; but, we fear, more to satisfy curiosity than from a desire to avoid danger. But the novelty of the thing gradually wore off, and the bridge stood alone and deserted, a monument to municipal folly.

A short time only had elapsed, when the passers by were startled by the loud braying of a horn, which was found to emanate from a photographer's window near by; and whose purpose was to gather a number of persons on the bridge, take their photographs, and dispose of them to the people thus favored for a modest consideration. This photographer has, we are informed, accumulated a small fortune by this lucky and ingenious speculation.

Another individual, familiarly known to the public as "Knox the Hatter," had a decided aversion to this structure, and grumbled at the way in which he had been deprived of light—the bridge having been built immediately over his doors. This person

has been instrumental in curtailing the photographers business, and in dealing the death blow to the bridge.

It was the intention of the Common Council to remove it (it having been declared a nuisance), but delay succeeded delay, and at length the exasperated hatter determined to remove the obnoxious structure. Accordingly, a sign was nailed upon the bridge which read as follows:

"I have been "Leow" for some time;
Hard "Knox" killed me at last."

On the 12th inst. its demolition was commenced, and in a few days the Broadway Bridge will be numbered among the "things that were." Thus has the city wastefully expended 30,000 dollars.

SPECIAL NOTICES.

☞ We desire to direct the attention of all manufacturers of gasworks and gas materials, contractors, engineers, and meter manufacturers, etc., to the advertisement of W. P. Fodell, Esq., on page 173. This work, which is now ready to publish, will go extensively into the hands of Gas Companies, Superintendents and gas men generally, and will be an excellent and very economical medium to advertise in. The author gives us the fo lowing schedule of prices, with or without cuts:

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☞ Important to Capitalists, Corporations, Etc. —Thirty-year Six Per Cent. U. S. Currency Bonds. These securities are the unconditional obligations of the Government, and constitute part of the funded debt of the United States. They have 30 years to run, and bear six per cent. interest, lawful money. The whole amount authorized by the Act of Congress is sixty millions, whereof forty-four millions ($44,000,000) have already been delivered to the Pacific Railroad Companies, and are mainly held for long investments by Trustees and moneyed Corporations, and by the Banking Department of the Treasury as security for circulation. Only sixteen millions remain to be issued, and after these are absorbed and the Loan closed, the Bonds will rarely be offered to the market. As these are the only six per cent. Bonds of the Government, having more than twenty years to run, their prospective value is enhanced correspondingly. Banking, Savings, Insurance, and other Companies, and Trustees and Capitalists may secure a portion of the remainder of the Loan on favorable terms on application to Fisk & Hatch, Bankers and dealers in Government Securities, No. 5 Nassau street. 2t

☞ The West Fairmount Gas Coal has lately been submitted by Mr. Henry Y. Attrill, of Baltimore, to Mr. Joseph A. Sabbaton, Engineer of the Manhattan Gas Light Company, and the result appears most satisfactory and proves that it is the best coal in the country for gas purposes. The result of the examination of four hogsheads was represented to be from the outcrop of the vein, a maximum yield of gas, per ton of 2,240 lbs., of 9,763 cub. ft. When the yield was restricted to 9,500 cub. ft., the illuminating power of the gas was equal to 17.54 standard candles. The yield of coke per ton was 36 bushels, weighing 1,460 lbs. of good quality, making but little clinkers. The sample was free from small coal, the lumps being large and clean. One bushel of the hydrate of lime purified 2,934 cub. ft. of gas. An analysis of the coal showed: Volatile matter, 38; fixed carbon, 7; ash, 5. A second sample of two hogsheads of large pieces, free from earthy matter, said to be mined at a greater depth than the first one, gave a maximum yield of 9,681 feet of gas per ton of 2,240 lbs. When the yield was restricted to 9,500 feet, the illuminating power of the gas was equal to 19.50 candles The yield of coke was 40 bushels, weighing 1,500 lbs. The quality was good, making but little ash or clinker. This coal contained considerably less sulphur than the first sample. One bushel of hydrate of lime purified 4,180 feet of gas. The analysis showed: Volatile matter, 37; fixed carbon, 59; ash, 4. This coal being almost entirely free from sulphur, makes it unequalled for glass manufacturers, and does not deteriorate by exposure to the atmosphere, and is recommended to shippers for long voyages, while for household and office use, it is superior to Scotch cannel, and can be delivered at any seaport town on the coast at half its cost. See advertisement elsewhere.

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Messrs. Geo. C. Hicks & Co., of Baltimore Md., have lately erected and now have in operation at that city, a manufactory of clay retorts for gas, sugar houses, etc.; also fire-proof brick and tiles, &c., for clay or iron retort settings. We understand the firm have a fine central location, transportation easy and cheap, and that their clays are of a very superior quality. With these conditions, their chance to supply a portion of the large and rapidly increasing demand for this class of manufactures is positive, and we wish them success in the new enterprise. Their advertisement will be found in this issue.

SCHOOL OF MINES, COLUMBIA COLLEGE

A circular from this College has been placed before us, in which it is proposed to establish in connection with its metallurgical department a Bureau of Statistics relating to the working of different ores in this country, where reliable information may be had. It is also in contemplation, with the aid of those engaged in the manufacture of the different metals, to form a Bureau, similar to the Bureau of Mineral Statistics connected with the Government School of Mines in London, with a view of having in this city as complete a collection as possible of statistics of the manufacture of the metals in this country.

OBITUARY.—In our columns will be found a full account of the singular death of Mr. J. E. Van Steenburgh, late President of the Cold Spring Gas Light Company, and cashier for eighteen years of the Bank of Fishkill. He was widely known and commanded the respect and esteem of all who were acquainted with him. His sudden death will be deeply regretted by all who knew him.

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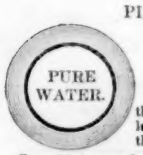

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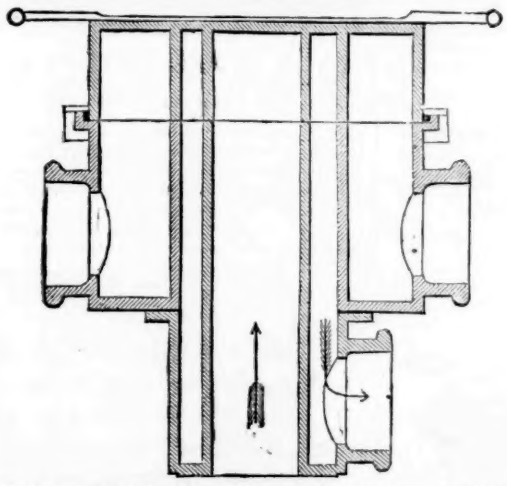

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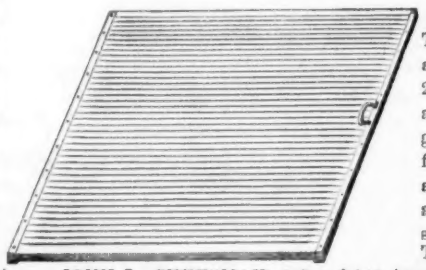

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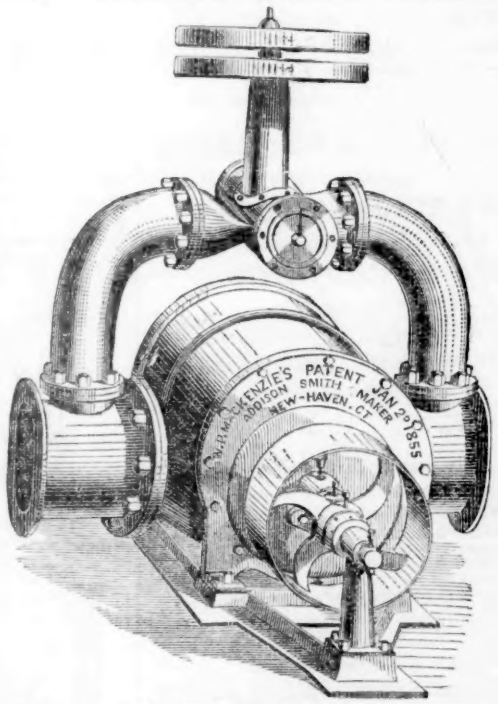

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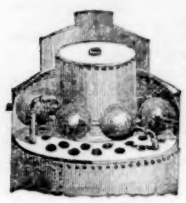

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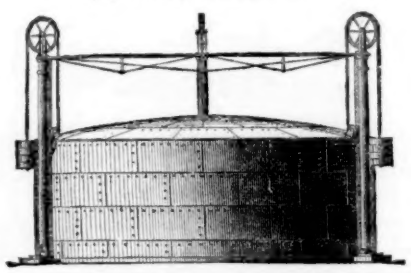

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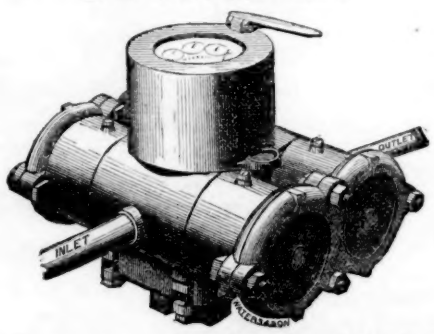

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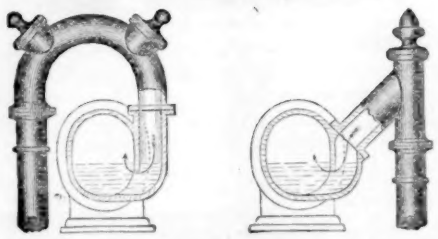

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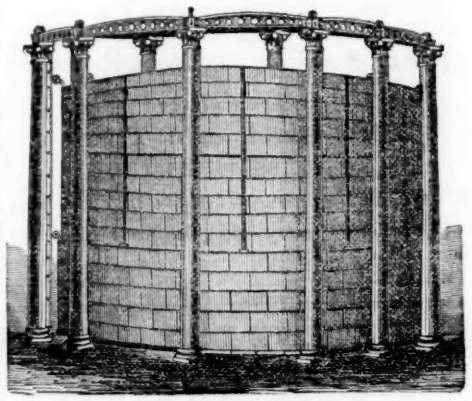

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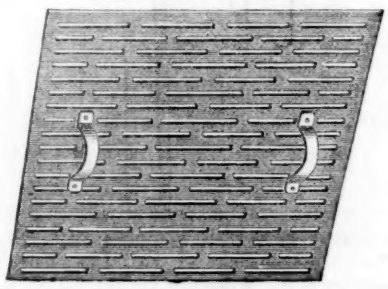

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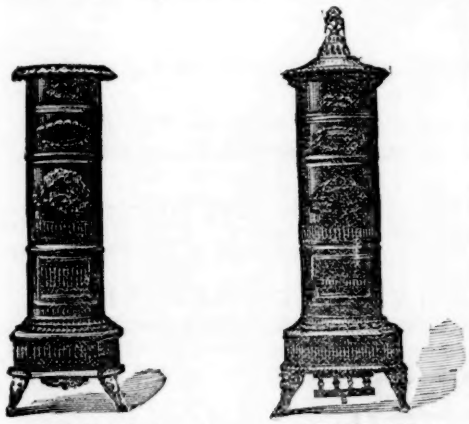

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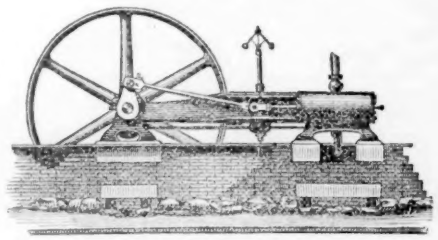

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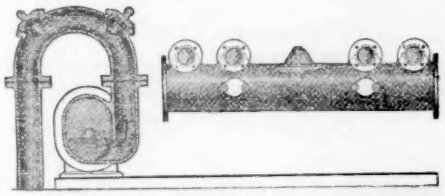

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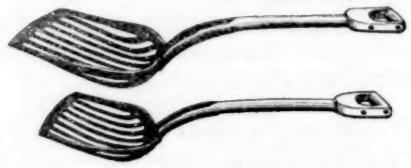

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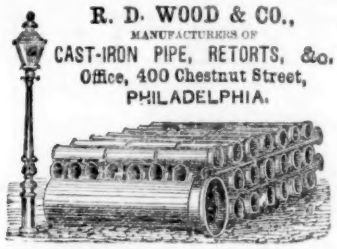

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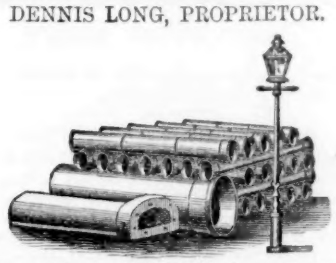

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San Salvador,	.. "	13
San Jacinto,	.. "	20
San Salvador,	.. "	27
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San Salvador	.. "	10
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214-3m

Foreign Gas Items.—The directors of the Watton Gas and Coke Company have issued a notice, says the London *Builder*, to the effect that from and after the 10th of November last the price of gas to the consumers would be reduced one-fourth, that is, to 7s. 6d. per 1,000 feet. For many years the directors were not able, of course, with such absurd prices as theirs, to pay any dividend. The only wonder is that it is said they are now paying a fair one.

From the same journal we learn that new gasworks have been erected at Langley Mill, adjoining the railway station, by the Langley Mill and Heanor Gaslight Company (Limited), for the supply of gas to Langley Mill and Heanor. The works have been designed and carried out under the superintendence of Mr. T. Crump, gas engineer, of Derby. The contractor for the building was Mr. Samuel Hunt, of Long Eaton. The Butterley Company supplied the castings and main pipes.

Explosion of Gas in East Cleveland.—On Dec. 5th, the residence of L. M. Hubby, in East Cleveland, was completely destroyed by an explosion of gas in the cellar from a leak in the service-pipe from the gas machine outside. Mr. Hubby observed that something was wrong with the gas, and descended into the cellar with a lighted candle, when an explosion took place, which shattered the house terribly, The building was instantly enveloped in flames and entirely consumed. The inmates were severely, but not fatally, injured.

Miscellaneous Items.

—A railroad from Davenport to St. Paul will pass through sixty miles of coal fields.

—Lake Superior iron ore to the amount of 420,000 tons was sold last year by Cleveland houses.

—Twenty-six hours' staging takes one from the Union Pacific Railroad terminus to Salt Lake.

—The St. Louis street cars have front platforms only and passengers pay the driver.

—The Worcester Gas Company's new gasometer is completed. Seven hundred thousand bricks were used in its construction. The capacity is 110,000 cub. feet. The cost amounts to $50,000.

Advertising Index.

☞ In looking for advertisements, see figures 1 to 9, within brackets, at head of advertisement pages.

GAS-BURNERS, APPARATUS ETC.

Arnold's Metallic Gas Trays—T. G. Arnold, 334 and 336 West 21st street, N. Y. ... 6
American Meter Company, 512 West 22d street, New York ... 8
Automatic Gas Purifier—State Rights for sale—Wm. C. Turnbull, care of T. C. Babcock, 59 Broadway, or office of the American Gas-Light Journal ... 2
Builder of Gas Works, Apparatus, Etc.—P. P. Delly, 39 Laurel street, Philadelphia ... 6
Begg's Lamp Regulator—Office Gas-Light Journal, 22 Pine st. ... 3
Cambridge Gas Stoves, Ranges, &c.—Gas Light Journal Offices, 8
Contractors for Gas-Works, Etc.—Murray, Baker & Walker, Fort Wayne, Ind. ... 9
Gas Fixtures, Etc.—Archer & Pancoast Manufacturing Co., 9, 11 and 13 Mercer street, New York ... 2
Gas Fitters' and Plumbers' Materials—McNab & Harlin, 86 John street, New York ... 1
Gas Coals—Bird, Perkins & Job, 104 Wall street, New York ... 4
Gas Engineers and Contractors—Hoy, Kennedy & Co., 111 Liberty street, New York ... 4
Gas-Burners—C. Gefrorer, 529 Commerce street, Philadelphia, Pa ... 9
Gas Meter Manufacturers—Harris & Bro., 1117 Cherry street, Philadelphia, Pa ... 8
Gas Superintendent—C. M. Cresson, 417 Walnut st., Phil., Pa. ... 9
Gas Apparatus, &c.—Geo. H. Kitchen & Co., 561 Broadway ... 9
Gas Burners—Wightman Bros., 25 Kilby st., Boston, Mass. ... 9
Gas Burners—T. G. Arnold, 224 and 226 West 21st st., N. Y. ... 9
Gas Burners—W. Anderson, cor Franklin & Elm sts., N. Y. ... 8
Gas Works for Sale—Colonel J. A. Sabbaton, Manhattan Gas Works, N. Y. ... 8
Gas Stoves—A. L. Bogart, 792 Broadway ... 7
Gas Fixtures, Meters, Etc., Etc.,—McHenry & Carson, Cincinnati, Ohio ... 4
Gas Fixtures & Chandeliers—Alfred Bliss & Co., 95 Bleecker-st., New York ... 4
Gasometers, Etc—George Stacey & Co. Cincinnati, O. ... 6
Gas-works of London—D. Van Nostrand, 192 Broadway ... 3
Gas and Kerosene Fixtures, &c.—Tucker Mfg Co., 128 William street, New York; 117 and 119 Court street, Boston, Mass. ... 3
Gas Works for sale—superintendent, Tiffin, Ohio ... 1
Patent Gas Exhauster—Smith & Sayre, 484 Broadway ... 5
Purifying Trays—Jno. L Cheeseman, 147 and 149 Ave. C, N.Y. ... 2
Portable Gas Works—Covell & Co., 554 Broadway, New York ... 3
Robbins' Patent Joint for Gas and Water Pipes ... 4
Stanley's Hydraulic Main, Etc.—L. F. Whiting, Boston ... 6

FOUNDRIES.

Brooklyn Tube Works—B T. Benton, Brooklyn ... 9
Columbian Iron Works—Wm. Taylor & Sons, 11, 13 and 15 Adams street, Brooklyn, N. Y. ... 7
Cast Iron Pipes and Fittings—B. S. Benson, 52 East Monument street, Baltimore, Md. ... 1
Continental Works—T. F. Rowland, Greenpoint ... 6
Erie Basin Iron Works—Elizabeth, Dwight and Van Dyke sts., South Brooklyn, N. Y ... 6, 7
Louisville Pipe Works—Dennis Long, Cor. 9th and Water-sts., Louisville, Ky ... 9
Manufacturing Enamelers—Nessle & Taylor, 97 Water street, Brooklyn, N. Y ... 7
National Foundry and Pipe Works—Wm. Smith, Carroll, Pike, Smallman and Wilkins streets, Pittsburgh, Pa ... 4
Oregon Iron Foundry—Herring & Floyd, 738, 740, 742 and 744 Greenwich street, New York ... 3
Pascal Iron Works—Morris, Taskar & Co., Philadelphia, Pa. ... 9
Southwark Foundry—Merrick & Sons, Fifth and Washington streets, Philadelphia ... 9
Wrought Iron Pipes, etc.—Joseph Nason & Co., 61 Beekman street, New York ... 4

WATER METERS, PUMPS, ETC.

Ashcroft's Low-water Detector, 50 John street, New York ... 6
Aubin Water Meter—H. Q. Hawley, Albany, N. Y. ... 7, 9
Babcock & Wilcox's Stationary Steam Engines ... 8
Davis' Steam Superheating Boiler—Duplex Steam Boiler Mf'g Company, Long Island City, N. Y ... 9
Pat. Lead-Encased Tin Pipes—Colwells, Shaw & Willard, foot of West 27th street, N. Y ... 4
Patent Dry Centre Valve—American Meter Company, 512 West 22d street New York ... 5
Steam Pumps—H. R. Worthington, 61 Beekman st. New York ... 7
Water Pipes, etc.—S. Fulton & Co. 207 North Water st Phila. ... 9
Water Closets, etc.—Wm. S. Carr & Co. 149, 151, 153, 155, 157 Centre street, New York ... 4
Water and Sewerage Pipes—Am. Water and Gas Pipe Company northwest corner of Green and Bay sts., Jersey City, N. J. ... 5
Worthington's Water Meters—H. R. Worthington, 61 Beekman street, New York ... 6

CLAY RETORT WORKS.

B. Kreisher, Clay Retorts, Etc., 58 Goerck street, New York ... 5
Bay State Clay Retort Works, 125, 127 Water st. Boston, Mass. ... 6
Brooklyn Clay Retort Works, Van Dyke st. Brooklyn, N. Y. ... 5
Jersey City Fire Brick Works.—J. H. Gautier & Co., Greene, Essex and Bergen streets, Morris Canal Basin, N. J. ... 5
Laclede Fire Brick Works, 1007 North Levee, St. Louis, Mo. ... 3
Manhattan Clay Retort Works, 15th st. near Av. C, New York ... 5
Philadelphia Fire Brick Works, Vine and 23d sts. Philadelphia ... 5
Retorts, Pipes, &c.—R. D. Wood & Co., 400 Chestnut street, Philadelphia ... 9

MINING MACHINERY, ETC.

Broker in Mining Stocks—C. H. Smith 145 B'way, New York ... 4
Industrial Chemistry—Prof. H. Dussauce, New Lebanon, N. Y. ... 2
Mining Engineer—J. H. Tiemann, 240 Pearl st. New York ... 4
Sodium Amalgam &c.—Prof. Wurtz, 26 Pine st., New York ... 6
School of Mines, Columbia College, East 49th st. " ... 2
J. S. Phillips, Mining Engineer, Wadsworth House, San Francisco, Cal ... 4

LAMPS, STOVES, PETROLEUM, ETC.

Lamps—F. H. Lovell & Co 233 Pearl street, New York ... 7
Street Lamps—J. G. Miner, Morrisania, Westchester Co., N.Y. ... 2
Lamps, &c.,—Julius Ives & Co., 49 Maiden Lane, N. Y. ... 9

MISCELLANEOUS.

A Rare Opportunity for Investment—Offices of this Journal ... 3
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Bird Cages—Osborn Manufacturing Company, 109 Bleecker st. ... 8
Cameron Coal Company—42 Broadway ... 1
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Empire Sewing Machine Company, 294 Bowery ... 6
Finkle & Lyon Sewing Machine Company, 581 Broadway ... 9
Fodell's "Book-keeping for Gas Companies" ... 2
Gas-Light Journal American and Foreign Patent Agency ... 8
Opposition S. S. Line to California—177 West st., cor. Warren ... 9
Professor Henry Wurtz—Office Gas-Light Journal ... 3
Prince's Metallic Paint—D. Sloan & Co. 115 Liberty street ... 5
Plastic Slate Roofing Co. 157 Broadway ... 8
Pianos—Raven & Bacon, 644 and 646 Broadway, N. Y. ... 9
Partner Wanted—Wm. Bent, Medina, Orange County, N. Y. ... 8
Platinum—Vessels, Apparatus, Sheet-wire, etc.—H. M. Raynor, 748 Broadway, N. Y. ... 3
Roofing Materials—E. Van Orden & Co. 41 Liberty st. ... 4
Rubber Goods—O. B. Gray, 291 Broadway ... 4
Smedberg's "Synopsis of Gas-Lighting" ... 2
Situation Wanted as Manager of a Gas Work ... 3
Steam Cooking Apparatus—Bennett, Johnson & Co., 42 Dey st., New York ... 6
Sabbaton's Patent Screening Shovels—A. T. Smithe, No. 126 Maiden Lane, New York city ... 8
Smith & Sayre Manufacturing Company, 95 Liberty street ... 5
Situation as Superintendent Wanted—Sup't Office G. L. Jour. ... 2
Situation Wanted by an Engineer of many years, Experience ... 6
Treatise on the Manufacture of Gas—D. Van Nostrand, 192 Broadway, New York ... 8
Ventilation—Henry A. Gouge, 254 Broadway ... 6
Watches—T. B. Bynner 189 Broadway ... 2
Works on the Manufacture of Gas—D. Van Nostrand, 192 Broadway, New York ... 2

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☞ All communications to be addressed to "The Editors," No 22 Pine Street, New York.

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